APPENDIX C:

Past and Present Resource Monitoring Summary

Line No	Park	Project	Years	Ongoing Y/N	Parameters	Products	Comments
1	KATM/ANIA	Bald Eagle Nesting Surveys- occupancy survey all years, production survey some years	Naknek drainage- 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1983, 1984, 1985, 1986, 1987, 1988, 1991, 1997, 1999, 2000 KATM coast- 1991		Nest locations No. nests Occupancy Hatching success Fledging success Nest substrate Etc.	Internal reports GIS nest theme	
2	KATM/ANIA	Breeding bird survey, VTTS road	1992, 1993, 1994, 1995, 1996, 2000		No. individuals by species	Internal reports	
3	KATM/ANIA	Snowshoe hare trend surveys, VTTS road	1989, 1990, 1991, 1992, 1993, 1994		No. hares observed along VTTS road	Internal reports	
4	KATM/ANIA	Cooperative Moose Trend Area Surveys (w/ ADF&G, USFWS)	Angle/Takayofo (Started in 1969)-Flown annually most years since 1969; currently done by NPS Branch (Started in 1978) (+Alagnak partial some later years)- Flown every few years by ADF&G or NPS Park Border (Started in 1981) - Annually most years since 1981 through 1995; used to be flown by USFWS/ADF&G…now flown every few years by ADF&G Aniakchak (Started in 1999) - Only 1 partial survey in '99 to date	Yes	Moose count by sex-age class	Internal reports Population trend data	Complete data sets reside w/ ADF&G; surveys have been coordinated between agencies; ADF&G flew most surveys in the past under coop agreement
5	KATM/ANIA	Bear Stream Surveys	1974, 1976, 1983, 1984, 1985, 1986, 1988, 1992, 1993		Bear count by stream, age-sex classed when possible	Internal reports	Money redirected in 1994 toward aerial salmon surveys of selected streams
6	KATM/ANIA	Brooks River Bear Monitoring	Monitoring began w/ research projects Troyer during 1970s; Braaten & Gilbert 1985-86; Warner collected data on bear use & human use in 1987; Olson & Gilbert conducted research & Olson prepared several annual reports on bear & human activity 1988-92; scan & focal sampling of bear & human activity was conducted again ~1996-2001	Yes	Individual bears numbered and identification records maintained Age-sex class of each bear identified recorded Bears by age-sex class per scan of river zone People per scan of river zone, recorded by general activity (angler, other, ...) Fish caught per min present and min fishing for bear focals Bear min per observation min for continuous data	Internal reports Peer-reviewed publications	

7	KATM/ANIA	Bear Management Report Forms	BMRFs have been completed annually at Brooks River since 1990 (varying degree of recording effort); a backcountry version of the BMRF has been in use also since 1990--not very consistently used	Yes	Various attributes associated with human-bear interactions--for example, minimum distance, predominant behavior of bear/people, types of deterrents used, etc.	Internal reports Conference poster presentation Peer-reviewed publication anticipated	
8	KATM/ANIA	Steller sea lions- aerial haulout surveys	Conducted annually by NMFS				
9	KATM/ANIA	Harbor seals - aerial surveys	Conducted every 5 years by NMFS				
10	KATM/ANIA	Snow depth surveys	Have been conducted monthly during winter for several years		Ocular estimate of snow gauge measurement of snow depth	Data are sent to a central repository (different agency); annual reports are prepared by that agency	
11	LACL	Snow course survey	1987-present	Yes, but somewhat erratic due to low staffing	Snowpack depth, snowpack water volume. Frequency: once/month Jan-April	Handwritten data sheets submitted to NRCS for monthly published data summaries	
12	LACL	Snowfall	1998-present	Yes	Daily snowfall at Pt. Alsworth	Internal spreadsheet	
13	LACL	Meteorology	1960-present	Yes	Daily; standard NWS (lo/hi temp, cloud cover, precip)	Glen Alsworth submits to NWS	
14	LACL	Meteorology	1991-present	Yes	15 min. intervals; standard RAWS at 2 locations (PTA, Stony) (lo/hi temp, RH, wind speed/dir, 10-hr. fuel moisture)	NIFC archival datafiles (raw data but no summaries)	
15	LACL	Spruce Bark Beetle	1989-present	Yes	Aerial mapping	GIS coverage updated annually	
16	LACL	River Discharge	1997-present (Johnson R.) 1999-present (Tlikakila R.)	Yes ??? May continue for length of salmon study depending on access	Continuous recording of stream flow	USGS database USGS technical reports	
17	LACL	Air Quality	2001-present	Yes	IMPROVE (particulates)	Raw data at NPS Air Quality Division	
18	LACL	Sockeye Salmon	1979-present	Yes	Annual escapement up Newhalen River (FRI, ADFG); July-August	FRI has raw data	

19	LACL	Sockeye Salmon	1979-present	Yes	Annual escapement up Newhalen River (FRI, ADFG); July-August	FRI has raw data	
20	LACL	Bald eagle survey	1991-97, 1999-2001	Yes but dependent on aircraft availability	May: # occupied nests, locations; July: nesting success and productivity	Internal report	
21	LACL	Moose (trend surveys)	1985, 1987-91, 1993-1994	No, trend surveys replaced with Gasaway	Nov/Dec annually: total numbers by cow, calf, bull; cow:calf and cow:bull ratio	Internal report	
22	LACL	Moose (Gasaway)	1992 and 1998 1994 and 1999	Yes, but with revisions to technique	Nov/Dec annually: population estimate; cow:calf and cow:bull ratios	Internal report	
23	LACL	Dall sheep	1978, 81, 84, 85, 87, 90	No, replaced with different technique	total number lambs, ewes, yearlings, ram by age class; ewe:lamb, ewe:ram ratios	Internal report	
24	LACL	Dall sheep	1992, 1995	No	population estimate; ewe:lamb, ewe:ram ratios	Internal report	
25	LACL	Trumpeter Swan	1984, 1992, 1995	No	distribution, production; number of adult pairs, cygnets, and adults-single or >=3	Internal report	
26	LACL	Beaver Cache Survey	1995-98	No, needs review of effectiveness in achieving objectives	number of lodges both active and inactive	Internal report	
		Atmospheric Resources					
	KEFJ	Mass balance snowpack measurements	1999 - present	Yes		?	
	KEFJ	Snow course survey	1986 - present	Yes	snowpack depth and density	?	
	KEFJ	Exit Glacier Weather		Yes	max/min temp, precip, snow", snow depth	?	
	KEFJ	Aialikbay weather	? - present	Yes	max/min temp, precip.	?	
	KEFJ	Nuka Bay weather	Periodic, when ranger station is staffed	No, Nuka Bay ranger station not staffed	max/min temp, precip.	?	

	KEFJ	Harding icefield shelter	? - present	Yes	temp	?	
	KEFJ	Taroka arm datalogger	?	?	?	?	
		Aquatic Resources					
	KEFJ	Stream gauging	? - present	Yes	River depth - Nuka River, Resurrection River, and Exit Creek	?	
	KEFJ	Babcock river profiles	1999 - 2001	No	?	?	
		Geologic Resources					
	KEFJ	Exit glacier transmitter	1996 - present	Yes	Glacial movement	?	
	KEFJ	Exit glacier terminus mapping	? - present	Yes	coordinates of glacial terminus	?	
	KEFJ	Coastal glacier photopoints	1985-1987	No	?	Photos lost	
		Soil Resources					
		Terrestrial Biota					
	KEFJ	icefield trail impact monitoring	? - present	yes?	?	?	
	KEFJ	Mountain goat surveys	1968 - 1999	unk	?	?	
	KEFJ	Bald eagle nest productivity	1986 - present	Yes	# of chicks fledged	periodic internal reports	
	KEFJ	Vegetation transects on the Upper Loop Trail	1988 - 2001	No, inadaquate sampling design	% cover moss and lichen, # of stems herbacious species	Internal final report 2001	
		Marine Biota					
	KEFJ	Harbor seal surveys	1979-1997	No	# of seals present, # of pups	periodic internal reports	
	KEFJ	Gull counts on squab and gull island	?	No	?	?	
	KEFJ	Marine bird surveys	?	?	?	?	
	KEFJ	Oystercatcher productivity surveys	1999 - present	yes	?	none	
		Integrated/Multi-resource Activities					
	KEFJ	Coastal campsite surveys	1988 - present	Yes	Area of impact	periodic internal reports (?)	
	KEFJ	Trail counter data	1996 - present	Yes	# of visitors	periodic internal reports	

Line No	Park	Issue/Resource	Concern(s)	Ranking
		Marine/Coastal		
	KATM/ANIA	Hydrocarbon contamination	Potential sources for hydrocarbon contamination include: tanker traffic from the Valdez Terminal, tanker traffic in Cook Inlet (Drift River Marine Terminal, Nikiski terminal…); offshore drilling and production platforms in Cook Inlet and expansions of such operations; and large tour vessels that operate carrying large reserves of heavy fuel oil. Hydrocarbon contamination could affect both flora and fauna.	
	KATM/ANIA	Marine mammal haulouts (Steller sea lions, harbor seals)	Are marine mammals abandoning haulouts in response to wildlife-viewing activities; are marine mammals avoiding or delaying use of haulouts in response to human activities [Note: 4 haulouts along the KATM coast have been identified as major haulout sites in 50 CFR 226.202 (Cape Gull, Cape Kuliak, Shakun Rocks, Takli Island)]?	
	KATM/ANIA	Sea otters	EVOS impacts?	
	LACL	Coastal shorebirds, harlequin ducks	What population changes are occurring and why?	
	LACL	Fisheries and clam harvest	Sustainable? What are basic population/distribution of harvested species? Secondary effects (marine debris, bilge dumping, fuel spills, collateral take, etc.)	
	LACL	Settlement (applies to non-coastal areas as well)	How are land use patterns affecting coastal habitat, wildlife, vegetation and soils? Direct and indirect impacts (habitat fragmentation) due to access (4-wheelers, aircraft, vehicles, boats)	
	LACL	Cook Inlet oil production/oil storage (Drift River)	Are impacts due to small-scale spills occurring now? What is the current status of the composition, structure and function of intertidal biota? How would population/diversity of coastal biota be affected by spills or remediation activities?	
	LACL	Access/port development due to mining and resource extraction activities	What changes in soils, estuarine environment, biota, marine currents, etc. could occur?	
	LACL	Logging on inholdings and adjacent state/private lands	Damage to intertidal biota from fugitive logs, spills of diesel or other contaminants, deposition of sediments in estuaries.	
	KEFJ	Commercial Fishing Shellfishing	Resource depletion	20
	KEFJ	Tour Boats	Effects of vessel traffic on wildlife	20

Line No	Park	Issue/Resource	Concern(s)	Ranking
	KEFJ	Tour Boats	Noise pollution	20
	KEFJ	Transportation of Hazardous Materials	Oil spills etc.	20
	KEFJ	Global Climate Change	Altered ecosystem processes	20
	KEFJ	Global Climate Change	Altered habitats	16
	KEFJ	Global Climate Change	Altered species ranges	16
	KEFJ	Global Climate Change	Increasing water temperatures	16
	KEFJ	Tour Boats	Toxic spills and pollution	16
	KEFJ	Camping	Displacement of wildlife	13
	KEFJ	Commercial Fishing Shellfishing	Toxic spills and pollution	12
	KEFJ	Park Operations	Displacement of wildlife	12
	KEFJ	Park Operations	Habitat loss from vegetation removal, trampling.	12
	KEFJ	Park Operations	Noise pollution	12
	KEFJ	Park Operations	Soil erosion and compaction	12
	KEFJ	Park Operations	Toxic spills and pollution	12
	KEFJ	Global Climate Change	Effects on species richness	12
	KEFJ	Commercial Fishing Shellfishing	Effects of vessel traffic on wildlife	11
	KEFJ	Commercial Fishing Shellfishing	Noise pollution	10
	KEFJ	Park Operations	Sewage and nutrient inputs	10
	KEFJ	Camping	Sewage and nutrient inputs	10
	KEFJ	Park Operations	Effects of vessel traffic on wildlife	9
	KEFJ	Offshore oil and gas development	Toxic spills and pollution	9
	KEFJ	Airborne Pollution	Air Quality, visibility	8
	KEFJ	Camping	Habitat loss from vegetation removal, trampling.	6
	KEFJ	Camping	Soil erosion and compaction	6
	KEFJ	Global Climate Change	Rising sea level	6
	KEFJ	Inholding Development	Displacement of wildlife	6
	KEFJ	Inholding Development	Habitat loss from vegetation removal, trampling.	6
	KEFJ	Inholding Development	Soil erosion and compaction	6
	KEFJ	Airborne Pollution	Nutrient inputs	6
	KEFJ	Airborne Pollution	Toxic inputs	4
	KEFJ	Aquaculture	Effects of vessel traffic on wildlife	4
	KEFJ	Aquaculture	Effects on species richness	4
	KEFJ	Aquaculture	Increased nutrient input	4
	KEFJ	Aquaculture	Introduction of Disease	4
	KEFJ	Aquaculture	Introduction of Exotic Species or different genetic stocks	4

Line No	Park	Issue/Resource	Concern(s)	Ranking
	KEFJ	Aquaculture	Light Pollution	4
	KEFJ	Aquaculture	Noise pollution	4
	KEFJ	Aquaculture	Toxic spills and pollution	4
	KEFJ	Inholding Development	Effects of vessel traffic on wildlife	4
	KEFJ	Inholding Development	Effects on species richness	4
	KEFJ	Inholding Development	Introduction of Exotic Species	4
	KEFJ	Inholding Development	Light Pollution	4
	KEFJ	Inholding Development	Noise pollution	4
	KEFJ	Inholding Development	Resource depletion from sport hunting and fishing and subsistence use	4
	KEFJ	Inholding Development	Sewage and nutrient inputs	4
	KEFJ	Inholding Development	Toxic spills and pollution	4
	KEFJ	Offshore oil and gas development	Effects of vessel traffic on wildlife	4
	KEFJ	Offshore oil and gas development	Light Pollution	4
	KEFJ	Offshore oil and gas development	Noise pollution	4
	KEFJ	Park Operations	Introduction of Exotic Species	4
	KEFJ	Airborne Pollution	Effects on species richness	3
	KEFJ	Camping	Effects on species richness	3
	KEFJ	Commercial Fishing Shellfishing	Effects on species richness	3
	KEFJ	Park Operations	Effects on species richness	3
	KEFJ	Offshore oil and gas development	Effects on species richness	3
	KEFJ	Tour Boats	Effects on species richness	3
		Terrestrial Fauna (Wildlife)		
	KATM/ANIA	Nesting Birds: Seabird colonies (~24 known colonies), shorebirds, waterfowl (harlequins…), bald eagles, . . .	Displacement of birds from nests by nearby aircraft (low overflights, landings on coastal islands, etc.) or boat activity. Displacement of birds from nests by other nearby human activity. Destruction of nests or nesting habitat by foot or plane traffic (ground nesters, photographers walking and climbing up near cliff and burrow nesters, etc.).	
	KATM/ANIA	Riverine birds (harlequin ducks, mergansers, etc.)	Human use, including aircraft and boat traffic, may displace these birds. Water quality could also affect them.	

Line No	Park	Issue/Resource	Concern(s)	Ranking
	KATM/ANIA	Breeding passerine bird populations	Changes in community diversity may occur due to effects of global warming, international land management policies, etc.	
	KATM/ANIA	Legal take of furbearers (beaver, red fox, coyote, wolf, river otter, wolverine, lynx, etc.)	Furbearers are subject to sport trapping in the preserves and to subsistence trapping in the preserves and monument; most species are also subject to sport hunting (red fox, coyote, wolves, lynx, and wolverine; harvest reports suggest most wolves taken by hunters). There are no limits on the numbers trapped, except for beaver. We know little about the health of furbearer populations; data consist of sealing records and anecdotal records of sightings. Due to insufficient data, we are unable to evaluate whether harvest pressure and trapping activities are degrading the resources and ecosystems within the unit.	
	KATM/ANIA	Discussion of predator control measures on the AK Peninsula	There has been increased discussion and proposals put forth related to predator species on the AK Peninsula. Even if predator-control efforts are not taken by the state, there may continue to be pressure to lengthen seasons and increase bag limits for wolves and bears.	
	KATM/ANIA	Legal take of moose and caribou	Sport hunting occurs in the preserves; subsistence hunting occurs in the preserves and monument. Currently, there is limited involvement of KATM with caribou monitoring--ADF&G and USFWS have been active in monitoring & research activities (looking at range and animal conditions; aerial photocensuses). See response to Q.2 re. moose trend surveys. A continuing question will be whether the maintained caribou population level is consistent with NPS management objectives (and whether we have sufficient information for this assessment).	
	KATM/ANIA	Legal take of brown bears	Sport hunting occurs in the preserves; subsistence hunting occurs in the preserves and monument. In 1994, a spring bear composition survey was flown in the preserve to assess the status of the bear population there. A continuing question will be whether the maintained brown bear population level is consistent with NPS management objectives (and whether we have sufficient data to assess this)	

Line No	Park	Issue/Resource	Concern(s)	Ranking
	KATM/ANIA	Illegal take of brown bears (and other wildlife)	We have limited patrol presence in the park, monument, and preserves. Poaching has occurred in the past and is likely to continue to some extent.	
	KATM/ANIA	Brown bears congregated on mud flats, coastal meadows, and salmon streams	Are aircraft overflights or landings or boat activity affecting bear use of habitat? Are bear-viewing activities, sportfishing, other activities such as rafting and camping affecting bear use of habitat (differential affects by age-sex class?, effects on bear numbers?, effects on bear use levels by location, time-of-day, etc.?, effects on foraging productivity?, effects on future behavior around people? . .)? How do specific types of human activities affect future human-bear interactions? General question re. best management practices for bear-viewing.	
	KATM/ANIA	Human-bear conflicts	How frequently are bears obtaining food from people? Under what circumstances? (food storage regulation) Are certain human activities associated with human-bear conflicts? Are management policies effective in minimizing human-bear conflicts?	
	KATM/ANIA	Arthropod distributions and numbers	Spruce beetles and an unidentified insect that feeds on willow leaves are known to be present in the spruce forest around Brooks Camp. Piles of brush and woody debris that may sometimes occur in association with road maintenance and other park operations could contribute to insect outbreaks.	
	LACL	Harvest	Are healthy (or natural and healthy) populations being maintained? Are naturally regulated predator/prey systems being maintained? Are harvest activities disrupting "normal" distribution patterns, behavior or activities? Species of concern are moose, bears, Dall sheep, caribou (potentially), wolves, wolverine, swans ??	
	LACL	Wildlife viewing (esp.bears)	Is bear behavior, population dynamics or distribution changing in popular bear viewing areas?	

Line No	Park	Issue/Resource	Concern(s)	Ranking
	LACL	Raptors	What is the population trend for Bald eagles, Golden eagles, Peregrine falcons, other raptors?	
	LACL	Habitat fragmentation	What is the potential for development patterns, access routes, inholdings, etc. to affect wildlife distribution and movement?	
		Terrestrial Vegetation		
	KATM/ANIA	Potential impacts of overnight or extended use by visitors on vegetation	How much is overnight use altering vegetation and soils (in what ways…?)? Are the number of social trails and campsites changing?	
	KATM/ANIA	ATV activity	Vegetation impacts from ATV use have been documented in parts of the unit; these impacts may increase.	
	KATM/ANIA	Vegetation loss and soil compaction in areas of high human use	Continued increases in visitation and modifications to concession and NPS facilities will have at least localized impacts on vegetation.	
	KATM/ANIA	Introduced non-native plan species	Potential for inadvertent introduction or spread of alien species through park operations or by other park users.	
	LACL	Overnight or extended visitor use of lakeshores	Are vegetation communities changing around backcountry campsites? Are rare/sensitive species at risk?	
	LACL	Insect outbreaks, fire	What are the natural cycles? Are they being disrupted or changed?	
	LACL	Invasive species	Which species are established? Are they spreading? Are control efforts successful?	
	LACL	Wood cutting	How do stand densities and species composition change? What are the secondary impacts of collateral damage, slash disposal and access?	
	LACL	Long-term vegetation community composition and structure, successional trajectories	Are they changing? Why? Could effects cascade throughout terrestrial and aquatic ecosystems?	
	LACL	Nonvascular plants	Can lichens be used as indicators for air contaminants? What is the status of non-vascular plants relative to caribou populations? Overgrazing?	
		Interior Forest Uplands		
	KEFJ	Motor Vehicle Use at Exit Glacier	Introduction of exotic species	20

Line No	Park	Issue/Resource	Concern(s)	Ranking
	KEFJ	Visitation	Introduction of exotic species	20
	KEFJ	Motor Vehicle Use at Exit Glacier	Noise pollution	18
	KEFJ	Motor Vehicle Use at Exit Glacier	Vehicle exhaust effects on vegetation	18
	KEFJ	Spruce Bark Beetle	Increased tree mortality	16
	KEFJ	External Development	Air Quality, visibility	14
	KEFJ	External Development	Effects on species richness	14
	KEFJ	External Development	Introduction of exotic species	14
	KEFJ	External Development	Noise pollution	14
	KEFJ	Motor Vehicle Use at Exit Glacier	Displacement of wildlife	12
	KEFJ	Park Operations	Introduction of exotic species	12
	KEFJ	Park Operations	Noise pollution	12
	KEFJ	Spruce Bark Beetle	Altered ecosystem processes	12
	KEFJ	Spruce Bark Beetle	Effects on species richness	12
	KEFJ	Visitation	Noise pollution	12
	KEFJ	External Development	Light Pollution	11
	KEFJ	Motor Vehicle Use at Exit Glacier	Wildlife mortality (road kills)	11
	KEFJ	Global Climate Change	Altered successional patterns	10
	KEFJ	External Development	Habitat loss	9
	KEFJ	Visitation	Displacement of wildlife	9
	KEFJ	Airborne Pollution	Effects on species richness	8
	KEFJ	Airborne Pollution	Effects on vegetation	8
	KEFJ	Global Climate Change	Altered species ranges	8
	KEFJ	Global Climate Change	Effects on species richness	8
	KEFJ	Park Operations	Displacement of wildlife	7
	KEFJ	Airborne Pollution	Air Quality, visibility	6
	KEFJ	Airborne Pollution	Altered ecosystem processes	6
	KEFJ	Airborne Pollution	Increased nutrient input	6
	KEFJ	Park Operations	Effects on species richness	6
	KEFJ	Park Operations	Habitat loss from development	6
	KEFJ	Park Operations	Light Pollution	6
	KEFJ	Park Operations	Sewage and nutrient inputs	6
	KEFJ	Park Operations	Soil erosion and compaction	6
	KEFJ	Park Operations	Vegetation damage from trampling, social trails	6
	KEFJ	Visitation	Soil erosion and compaction	4
	KEFJ	Visitation	Vegetation damage from trampling, social trails	4

Line No	Park	Issue/Resource	Concern(s)	Ranking
	KEFJ	Wildfire	Effects on vegetation	4
	KEFJ	Wildfire	Effects on wildlife	4
	KEFJ	Wildfire	Soil erosion	4
		Freshwater Aquatic Biota/Habitat		
	KATM/ANIA	Hydrocarbon contamination	Fuels are flown into lodges, or brought in by boat; hydrocarbon contamination from leaks and spills has been documented at Brooks Camp & near the mouth of Kulik River. Any future developments also have the potential for fuel leaks and spills. Access throughout the park & preserve by aircraft, motorboats, and snowmachines is largely unrestricted.	
	KATM/ANIA	Grey water & sewage system impacts	Other potential water quality issues associated with developments include increased bacterial levels and changes in water clarity.	
	KATM/ANIA	Other water quality issues	Trampling impacts? Boat and aircraft traffic impacts?	
	KATM/ANIA	Salmon and Rainbow Trout	Human overharvest (salmon commercial, etc.), declining runs, other human impacts to trout (reductions in size and age due to increased angler effort and catch?) unknown effect on trophic interactions in large lake systems.	
	KATM/ANIA	Degradation due to non-native animals	Several crater lake fish populations contain reproducing fish that are believed to have been artificially introduced.	
	LACL	Harvest of resident fish	What is a sustainable harvest that maintains natural and healthy populations? What are the effects of jet boats and fishing methods on populations, water resources, etc.?	
	LACL	Water quality-Lake Clark	What is the current and future water quality picture for Lake Clark as inholdings are developed? (fuel spills, sewage disposal, gravel extraction, shoreline compaction due to vehicle use, contaminants from trash disposal, effects on salmon spawning beds) How will water quality be affected by glacier recession/global climate change? What will be the wide-scale ecological effects (lake productivity/salmon)?	

Line No	Park	Issue/Resource	Concern(s)	Ranking
	LACL	General "health" of aquatic ecosystems	Are there indicators of generalized change due to air quality or water chemistry? Wood frogs? Primary productivity? Macroinvertebrates? What is the natural range of variability (in primary productivity, nutrient cycling, etc.) and how does it differ among the 4 "mega" watersheds in the park (Cook Inlet, Kvichak, Nushagak, Kuskokwim)?	
	LACL	Global development	How are glaciers and freshwater resources affected?	
	LACL	Resource extraction activities (logging, mining)	What changes may be occurring in water quality, hydrology, and aquatic habitat due to access, erosion, spills, ore geochemistry, etc.?	
	LACL	Anadromous salmon	What is causing run declines? Are conditions in park watersheds contributing factors? What is the range of natural variation in salmon runs in the park? Prehistoric productivity? Are variations in salmon runs in the Kvichak reflected in the other major watersheds? Why/why not? What are the effects of declining salmon on trophic interactions in large lake systems? What will be the long-term effects of salmon declines on terrestrial ecosystems (ie bears, bald eagles, scavengers, riparian vegetation, etc.?)	
	KEFJ	Bradley Lake Project	Reduced, unnatural water flow to Nuka River	14
	KEFJ	Motor Vehicle Traffic at Exit Glacier	Toxic spills and pollution	12
	KEFJ	Sport fishing	Displacement of wildlife	12
	KEFJ	Sport fishing	Soil erosion and compaction	12
	KEFJ	Airborne Pollution	Altered water chemistry	10
	KEFJ	Park Operations	Toxic spills and pollution	10
	KEFJ	Sport fishing	Resource depletion	10
	KEFJ	Snowmachines	Toxic spills and pollution	8
	KEFJ	Visitation	Damage to riparian vegetation from trampling	8
	KEFJ	Global Climate Change	Effects on species richness	6
	KEFJ	Park Operations	Sewage and nutrient inputs	6
	KEFJ	Bradley Lake Project	Effects on species richness	5
	KEFJ	Global Climate Change	Altered hydrologic regimes	4
	KEFJ	Inholding Development	Damage to riparian vegetation from trampling	4
	KEFJ	Inholding Development	Effects on species richness	4
	KEFJ	Inholding Development	Resource extraction	4

Line No	Park	Issue/Resource	Concern(s)	Ranking
	KEFJ	Inholding Development	Sewage and nutrient inputs	4
	KEFJ	Inholding Development	Stream bank erosion	4
	KEFJ	Inholding Development	Toxic spills and pollution	4
	KEFJ	Park Operations	Damage to riparian vegetation from trampling	4
	KEFJ	Park Operations	Stream bank erosion	4
	KEFJ	Visitation	Sewage and nutrient inputs	4
	KEFJ	Visitation	Stream bank erosion	4
	KEFJ	Airborne Pollution	Effects on species richness	3
	KEFJ	Sport fishing	Effects on species richness	3
		Geologic/Atmospheric Resources		
	KATM/ANIA	Human-generated sources of air pollution	Sources of air pollution including air and auto traffic in Naknek and King Salmon; smoke from incinerators, stoves, etc.; generation of electricity using petroleum in Naknek, remote villages, etc, …could impact many resources including human values such as visibility, water, soils, plant species, herbivores, etc.	
		Human Resources		
	KATM/ANIA	Changes in visitation	Better information regarding visitor use trends would be beneficial for managers in assessing baseline conditions and potential future conditions of resources. The information would also be useful for assessing "visitor experiences."	
		Cultural Resources		
	KATM/ANIA	Archaeological sites	Human-caused threats to archaeological sites include vandalism, illicit digging in sites, and removal of artifacts. These activities can cause irreparable damage.	
	KATM/ANIA	(Focused here mostly on human-caused disturbances rather than natural--for example, fire, winds, disease, etc. could alter habitat . . .		

Line No	Park	Issue/Resource	Concern(s)	Ranking
	KATM/ANIA	(Focused on potential impacts within & near the park/preserves/monument; there are other issues of concern such		
		General Physical Resources/Issues		
	LACL	Air quality	Are there local or regional air quality changes occurring? (coast, may also be a local issue at Port Alsworth). What are the contaminant pathways into terrestrial/aquatic ecosystems? Visibility impacts?	
	LACL	Wilderness	Are natural soundscapes being maintained?	
	LACL	Volcanic eruptions	Landscape scale changes to biotic and abiotic resources	
	LACL	Soils	Are soil temperatures, permafrost distribution patterns and depths changing?	
	LACL	Meteorology	Basic data needed for a large variety of purposes related to monitoring and research activities. Are there "geo-archives" (glaciers/sediment cores) that could be used to reconstruct past climates and project future scenarios?	
		Icefields/Glaciers		
	KEFJ	Global Climate Change	Altered precip patterns	16
	KEFJ	Global Climate Change	Glacial retreat	16
	KEFJ	Airborne Pollution	Effects on wildlife (iceworms) and vegetation	10
	KEFJ	Development - internal and external	Air Quality	8
	KEFJ	Development - internal and external	Light Pollution	8
	KEFJ	Development - internal and external	Noise pollution	8
	KEFJ	Airborne Pollution	Air Quality, visibility	6
	KEFJ	Development - internal and external	Displacement of wildlife	6
	KEFJ	Visitation	Noise pollution	6
	KEFJ	Development - internal and external	Toxic spills and pollution	4
	KEFJ	Park Operations	Displacement of wildlife	4
	KEFJ	Park Operations	Noise pollution	4
	KEFJ	Snowmachine use	Air Quality	4
	KEFJ	Snowmachine use	Displacement of wildlife	4
	KEFJ	Snowmachine use	Noise pollution	4
	KEFJ	Visitation	Human wastes	4

Line No	Park	Issue/Resource	Concern(s)	Ranking
		Alpine		
	KEFJ	Visitation	Social trail development	18
	KEFJ	Visitation	Displacement of wildlife	12
	KEFJ	Visitation	Soil erosion and compaction	12
	KEFJ	External Development	Air Quality, visibility	11
	KEFJ	External Development	Light Pollution	11
	KEFJ	External Development	Noise pollution	11
	KEFJ	Airborne Pollution	Effects on species richness	10
	KEFJ	Airborne Pollution	Effects on vegetation	10
	KEFJ	Global Climate Change	Effects on species richness	10
	KEFJ	Airborne Pollution	Increased nutrient input	8
	KEFJ	Global Climate Change	Altered ecosystem processes	8
	KEFJ	Global Climate Change	Altered species ranges	8
	KEFJ	Airborne Pollution	Air Quality, visibility	6
	KEFJ	Airborne Pollution	Altered ecosystem processes	6
	KEFJ	Park Operations	Introduction of Exotic Species	6
	KEFJ	Park Operations	Toxic spills and pollution	6
	KEFJ	Visitation	Noise pollution	6
	KEFJ	Park Operations	Displacement of wildlife	4
	KEFJ	Park Operations	Noise pollution	4
	KEFJ	Park Operations	Sewage and nutrient inputs	4
	KEFJ	Park Operations	Soil erosion and compaction	4
	KEFJ	Park Operations	Trail development	4
	KEFJ	Snowmachine use	Displacement of wildlife	4
	KEFJ	Snowmachine use	Noise pollution	4
	KEFJ	Snowmachine use	Toxic spills and pollution	4
	KEFJ	Snowmachine use	Vegetation damage	4
	KEFJ	Visitation	Introduction of exotic species	4
	KEFJ	Visitation	Sewage and nutrient inputs	4
		Coastal Rainforest		
	KEFJ	Spruce Bark Beetle	Increased tree mortality	16
	KEFJ	Spruce Bark Beetle	Altered ecosystem processes	12
	KEFJ	Spruce Bark Beetle	Effects on species richness	12

Line No	Park	Issue/Resource	Concern(s)	Ranking
	KEFJ	Visitation	Vegetation damage from trampling, social trails, firewood collection	12
	KEFJ	Park Operations	Toxic spills and pollution	10
	KEFJ	Visitation	Displacement of wildlife	10
	KEFJ	Global Climate Change	Altered species ranges	8
	KEFJ	Global Climate Change	Altered successional patterns	8
	KEFJ	Global Climate Change	Effects on species richness	8
	KEFJ	Park Operations	Sewage and nutrient inputs	8
	KEFJ	Visitation	Sewage and nutrient inputs	8
	KEFJ	Airborne Pollution	Altered ecosystem processes	6
	KEFJ	Airborne Pollution	Effects on species richness	6
	KEFJ	Airborne Pollution	Effects on Vegetation	6
	KEFJ	Airborne Pollution	Increased nutrient input	6
	KEFJ	Park Operations	Displacement of wildlife	6
	KEFJ	Park Operations	Effects on species richness	6
	KEFJ	Park Operations	Loss of habitat	6
	KEFJ	Park Operations	Noise pollution	6
	KEFJ	Park Operations	Soil erosion and compaction	6
	KEFJ	Park Operations	Trail development	6
	KEFJ	Visitation	Soil erosion and compaction	6
	KEFJ	Global Climate Change	Rising sea level	4
	KEFJ	Inholding Development	Displacement of wildlife	4
	KEFJ	Inholding Development	Effects on species richness	4
	KEFJ	Inholding Development	Introduction of exotic species	4
	KEFJ	Inholding Development	Light Pollution	4
	KEFJ	Inholding Development	Loss of habitat	4
	KEFJ	Inholding Development	Noise pollution	4
	KEFJ	Inholding Development	Resource depletion from extractive uses	4
	KEFJ	Inholding Development	Sewage and nutrient inputs	4
	KEFJ	Inholding Development	Soil erosion and compaction	4
	KEFJ	Inholding Development	Toxic spills and pollution	4
	KEFJ	Inholding Development	Trail development	4
	KEFJ	Park Operations	Introduction of exotic species	4
	KEFJ	Park Operations	Light Pollution	4
	KEFJ	Visitation	Noise pollution	4

	Management Issues Identified at SWAN Parks	Marine/Coastal				Terrestrial-Vegetated Zone				Terrestrial - Rock&Ice				Freshwater Aquatics			
		ANIA	KATM	KEFJ	LACL	ANIA	KATM	KEFJ	LACL	ANIA	KATM	KEFJ	LACL	ANIA	KATM	KEFJ	LACL
	Pollution																
1	Oil and gas transport & storage	X	X	X	X							X		X	X	X	
2	Airborne pollution or visibility			X	X			X	X	X	X	X	X			X	X
3	Noise pollution			X	X			X	X			X	X				X
4	Sewage or human wastes			X				X				X		X	X	X	X
5	Water pollution from motorized vehicles				X									X	X		X
6	Light pollution			X				X				X					
7	Debris and dumping from fishing activities				X												
	Biological Resources																
1	Habitat fragmentation	X	X	X	X	X	X	X	X			X					
2	Loss of community diversity			X	X	X	X	X				X				X	X
3	Wildlife disturbance and displacement			X	X	X	X	X				X				X	
4	Exotic species introductions			X		X	X	X	X			X		X	X		
5	Introduction of diseases			X													
6	Population decline in shorebirds/harlequin ducks	X	X		X												
7	Sustainable population of fish													X	X	X	X
8	Trophic interactions in large lake systems													X	X		X
9	Long-term affects on salmon populations on terrestrial ecosystems.																X
10	Insect outbreaks			X		X	X	X	X								
11	Human impact on Pinipeds	X	X	X													
12	Poaching					X	X										
13	Lack of knowledge on the health of furbearers population	X	X			X	X										
14	Lack of knowledge on the large mammal population					X	X										

	Management Issues Identified at SWAN Parks	Marine/Coastal				Terrestrial-Vegetated Zone				Terrestrial - Rock&Ice				Freshwater Aquatics			
		ANIA	KATM	KEFJ	LACL	ANIA	KATM	KEFJ	LACL	ANIA	KATM	KEFJ	LACL	ANIA	KATM	KEFJ	LACL
15	Raptor populations and trends								X								
16	Impact on shorelines	X	X	X	X											X	X
17	Long-term vegetation community composition and structure				X				X								
18	Relationship of lichen to environment and animals								X								
19	Wildlife mortality due to roadkill							X									
20	General health of aquatic ecosystems																X
21	Composition, structure and function of intertidal biota				X												
22	Potential risk to rare plants								X								
23	Natural predator/prey systems being maintained					X	X		X								
24	Baterial levels in fresh waters													X	X	X	
	Commercial Human Use																
1	Commercial Fishing			X	X									X	X		
2	Settlement impact			X	X											X	
3	Port/Access Development				X									X	X		
4	Logging				X												
5	Tour Boats			X	X									X	X		
6	Aquaculture			X	X												
7	Vessel traffic			X	X	X	X							X	X		
8	Small aircraft				X	X	X							X	X		
	Other Human Use																
1	Camping			X	X	X	X		X								
2	ATV Activity					X	X										
3	Sport hunting/fishing				X	X	X		X					X	X	X	X
4	Subsistence impact on wildlife populations				X	X	X		X								

	Management Issues Identified at SWAN Parks	Marine/Coastal				Terrestrial-Vegetated Zone				Terrestrial - Rock&Ice				Freshwater Aquatics			
		ANIA	KATM	KEFJ	LACL	ANIA	KATM	KEFJ	LACL	ANIA	KATM	KEFJ	LACL	ANIA	KATM	KEFJ	LACL
5	wildlife-viewing (bears, marine mammals)	X	X			X	X		X								
6	Number of campsites and social trails changing			X		X	X	X				X					
7	Secondary impacts of wood cutting			X					X								
8	Snowmachine use											X		X			
9	Vehicles				X												
10	Resource extraction (mining)				X											X	X
	Physical Change																
1	Soil erosion			X	X	X	X	X				X				X	
2	Change in sea level			X													
3	Change in water temperature			X													X
4	Change in Climate			X	X	X	X	X	X			X	X			X	X
5	Glacier Changes				X				X			X	X				X
6	Wildfire							X								X	
7	Change in water chemistry															X	
8	Volcanic eruptions				X				X				X				X
9	Soil temperature				X				X				X				X
10	Permafrost changes				X				X				X				X
11	Altered precipitation patterns											X					
12	Meteorology												X				